REMARKS

The Examiner is requested to reconsider his rejection of Claims 12, 14 and 15 as being clearly anticipated by Trulson et al (US '967).

The Examiner states at Page 3, last paragraph that Trulson et al's apparatus permits substantially oil-free water (abstract).

Trulson et al's invention is a one-way flow device and at no time would it be possible to back pulse either the subject application's chemical cleaning solutions or permeate waters as described by Yunoki and others.

Trulson et al teach the use of an inorganic tube having deposited thereon a fine inorganic layer (which incidentally can take up to 24 hours to deposit), which would be totally vulnerable to back-flushing, in view of the impermanence of his deposited filtration layer. The effect of backflushing with water would be to dislodge his filtration layer from off its supporting tube substrate. The further effect of backflushing with chemical cleaning fluids can only be surmised as being even more damaging.

Trulson et al teach the preparation and application of ultra-filtration membranes by slurry deposition on a porous matrix core typically a carbon cylinder. These membranes, it must be pointed out, are not sintered membranes but are deposited by circulating a colloidial solution under pressure in order to effect the deposition of the ultra-filtration membrane on the inner wall of the filter support tube. This process of deposition can take up to 24 hours. Furthermore Trulson et al teach that such built-up fine particle membrane layers often must be protected by a water permeable layer.

Clearly, the Trulson et al teachings cannot be combined with any backwashing teachings. Haney relies upon membrane filtration, where molecule follows molecule through the

pores of his nano-filtration membrane. The Haney membrane also is entirely susceptible to fouling, and its manner of commercial use is to discard the fouled membrane, and substitute a new membrane. The rates of filtration by a Haney membrane are such that its practical use as a substitute for the present invention would be ludicrous. Furthermore, Haney, at Column 13, lines 6-8 clearly disclaims any need for chemical treatment of his membrane separator. The backflush provisions of Haney appear to be entirely limited to use with water.

Haney is specifically directed to reverse osmosis membranes, and not to the ultra filtration membranes of the present invention. These are totally different applications.

The presently disclosed Ultra filtration involves a fine filter whereby water or other liquids may pass as a flow. The reverse osmosis (nano-filtration) of Haney operates as a molecular sieve and as such is unrelated to the present technology. Haney teaches a more efficient way to pass molecules of water through a reverse osmosis membrane. In contrast, the ultra-filtration (of the present invention) is a flow of liquid water across a membrane whose pore size allows the flow of water. It would be economically totally unviable in a real life situation to use reverse osmosis membranes in the treatment of oil contaminated waters. Such polymeric membranes foul readily and irreversibly in such situations. They cannot generally be recovered to reasonable flux levels even when using the techniques as described in the subject application. At the heart of Haney's invention is a complex series of valves and orifices apparently useful in achieving certain efficiencies **in reverse osmosis.** Furthermore, Haney uses a traditional spiral wound reverse osmosis membrane. These membranes are totally inappropriate to oil/water separation technology. Haney's first statement under "Field of the Invention" states that

the "invention relates to water treatment systems of the type utilizing reverse osmosis and/or nano-filtration thin film membrane separation technology". Immediately after that statement Haney talks about the various technologies used that his invention replaces. Of the contaminants removed that he refers to, nowhere is oil or petroleum products referred to.

Thus, besides being totally impractical, the Trulson et al/Haney combination suggested by the Examiner, besides being essentially incompatible and inoperable, would lead one skilled in the art away from the present invention

For purposes of affording further distinction over the cited references, Claim 12 has been amended by the inclusion of the limitations of Claim 13, being further limited to include a plurality of individual cleaning solution tanks, with the manifold means to admit a "selected said cleaning solution from said storage means."

Turning to the matter of Yunoki, his back-flush system relies upon displacing back-flush fluid with a membrane, under water pressure, as a form of short-stroke pump. The volume displacement capability of this Yunoki system is so limited that it could only operate, in practical terms, to backwash with permeate (water) to mitigate initial deposition upon the face of the filter medium. Yunoki most certainly would not lead one skilled in the art to make use of such teachings to power a selected chemical back-flush regime to clean a membrane.

The present invention does not use a diaphragm arrangement. Instead, it uses a simple air driven cleaning liquid back flow arrangement.

The difference and the essence of the present invention is that it does not rely upon back wash with permeate to effect a cleaning action on the membrane. The essence of the

present invention is backwashing or back pulsing one of a variety of hot cleaning solutions in a back wash manner.

The approach used by Yunoki and many others to simply backwash ambient temperature permeate through the membrane does not achieve the cleaning efficiencies of the present invention. The present inventor has tried this permeate back wash approach in the past, and discarded it; the resultant permeate production curve appears much like a decaying saw-tooth curve. Any gains from cleaning by back washing permeate are short-lived.

In contrast, using the presently disclosed apparatus and technique, an effective cleaning of the membrane is achieved. The various cleaning chemicals that are heated and used effect an efficient solvent action on the various contaminants that are fouling the membrane pores or membrane surface. These solvents loosen the bonds that the contaminants make with the membrane pore walls. Once dissolved and under back pressure, these loosened contaminants are then blown off the membrane.

Also, the combined references fail to provide the means necessary to effectively administer a chemical backflush selected from a plurality of individual cleaning solution tanks.

Consideration of the amended claim 12 and the other amended claims in light of the foregoing remarks, with a view to allowance is respectfully requested.

Respectfully submitted,

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Claims.

Claims 1-11 (withdrawn). 12. (currently amended); 13. (cancelled) 14 (currently amended), 15 (original), 16 (original), 17 (currently amended), 18 (original), 19 (original), 20 (original).

12(currently amended). Apparatus for retrieving re-usable water from an intimate water/oil --contaminated mixture, said apparatus having a cross-flow filter module to permit the passage of substantially oil-free water as a permeate through the filter module; pumping means to circulate said contaminated mixture through said module at a predetermined flow rate sufficient to substantially resist deposition of contaminants and to scour a surface membrane portion of said filter module; ~~and~~ permeate accumulation and drain means to receive said permeate for disposal, and cleaning solution storage means having a plurality of individual cleaning solution tanks, manifold means interconnecting elements of said apparatus; and control means including solenoid actuated valves connected with said apparatus elements and said manifold means, in use to drain said permeate from said module, and to admit a selected said cleaning solution from said storage means to said module in back-flushing relation with said surface membrane portion of the module, for frequent and regular cleaning cycles, wherein, in use the concentration of oil within said contaminated mixture is progressively increased to a predetermined optimum practical limit.

13. (cancelled) The apparatus as set forth in Claim 12, including cleaning solution storage means, manifold means interconnecting elements of said apparatus; and control means including solenoid actuated valves connected with said apparatus elements and said manifold means, in use to drain said permeate from said module, and to admit cleaning

solution from said storage means to said module in back-flushing relation with said surface membrane portion of the module.

14(currently amended). The apparatus as set forth in Claim 12, said filter module having a central tube incorporating said surface membrane portion, an outer housing in radially spaced relation from said tube, forming an annular space therebetween, sealing ring means located adjacent the ends of said central tube in interposed sealing, supporting relation between said tube and said pipe, and an end fitting secured in sealing relation with the end of said housing to enable the flow of said contaminated mixture through said end fitting and ~~into~~ through said tube.

15(original). The apparatus as set forth in Claim 14, said sealing ring means at each end of said tube having two 0-ring seals in mutual axially spaced relation.

16(original). The apparatus as set forth in claim 12, including compressed air means connected to said permeate accumulation means, and control means to admit compressed air in compressing relation with said permeate, in use to create a back~flushing motion of said permeate through said filter surface membrane.

17. (currently amended) The apparatus as set forth in Claim ~~13~~ 12, wherein said apparatus is mounted within a cabinet, including computerized control means in programmed controlling relation with the apparatus.

18(original). The apparatus as set forth in Claim 17, wherein said cabinet contains two said processing loops mounted in back-to-back relation, and pivot means enabling the reversal of said modules, to facilitate access thereto for purposes of servicing.

19(original). The apparatus as set forth in Claim 17, said computerized control means serving a plurality of said filter modules in individual liquid filtering and filter cleaning

modes of operation of the apparatus.

20(original). The apparatus as set forth in Claim 12, said permeate accumulation means having a substantially minimal volume, to minimize the volume of cleaning liquid required to fill said permeate accumulation means, for purposes of cleaning said filter module by back-flushing with said cleaning liquid.